

W.Q. LIB  
MONTREAL A. (28)



THE  
ONTARIO WATER RESOURCES  
COMMISSION

WATER POLLUTION SURVEY

of the

COMMUNITY OF ELK LAKE

in the

TOWNSHIP OF JAMES

1968

STANDARDS DEVELOPMENT BRANCH OMNR  
36936000010228

COMMUNITY OF ELK LAKE - 1968  
TOWNSHIP OF JAMES.

TD  
380  
.E45  
1968  
MOE

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at [copyright@ontario.ca](mailto:copyright@ontario.ca)

**TD  
380  
.E45  
1968**

Report on a water pollution  
survey of the community of Elk  
Lake, township of James.

80380

Report

on a

Water Pollution Survey

of the

COMMUNITY OF ELK LAKE

Township of James

January 1968

District Engineers Branch

The Division of Sanitary Engineering

## INDEX

<u>SECTION</u>	<u>PAGE NO.</u>
I INTRODUCTION	1
II GENERAL INFORMATION	1
III DRINKING WATER SUPPLIES	2
IV SEWAGE DISPOSAL AND STORM DRAINAGE	4
V REFUSE DISPOSAL SITE	5
VI RESULTS OF SAMPLES COLLECTED	6
VII SUMMARY	6
VIII RECOMMENDATIONS	7
APPENDICES	
TABLES	
MAP	

## R E P O R T

### THE ONTARIO WATER RESOURCES COMMISSION

#### I INTRODUCTION

This survey was made for the purpose of assessing the conditions with respect to water pollution in the community of Elk Lake. These surveys are made by the Ontario Water Resources Commission to locate and record existing and potential sources of water pollution and when the sources are noted, recommendations concerning their abatement are made to the parties concerned.

Samples were collected from the Montreal and Makobe rivers and any known discharges thereto on August 22, 1967. The results of these samples are listed in the appendix to the report; also included is an explanation of the tests performed on the samples and a map of the community showing the approximate sampling point locations.

#### II GENERAL INFORMATION

The community lies on the Montreal River almost 80 miles upstream from its mouth at the Ottawa River. Although Elk Lake is not incorporated, it contains the majority of the population in the Township of James which in 1966 was assessed at 634.

The water supply is provided by numerous small private water systems. Private sewage disposal facilities consisting of septic tanks and sub-surface disposal or privies are used. Storm water flows in ditches and improved drains to the Montreal and Makobe rivers.

Forestry is the sole industry of the community; therefore, there are no problems of liquid industrial waste disposal. The refuse disposal site is located just west of the community.

There is a swimming area on the south shore of the Montreal River just west of the mouth of the Makobe River. Also swimming occurs to a very limited extent in the Makobe River. Although many boats are used in the area, the number of large watercraft having living accommodations which could contribute to water pollution is insignificant.

### III DRINKING WATER SUPPLIES

Several private water supply systems serve the community having the Makobe and Montreal rivers as the source of supply. Three of these systems serve more than five residences and are inspected regularly by the OWRC. Two of these known as the Elk Lake supply and the Makobe River supply are owned and operated by Mr. L. Laurin. In the Elk Lake system, water is obtained from the Montreal River, chlorinated, and distributed to 32 homes.\* Likewise, water is obtained from the Makobe River, chlorinated and distributed to 37 homes.\* Intermittent adverse bacteriological results in both of these supplies have indicated the need for improved chlorination procedures.

\* as of October, 1966

A third water supply system is operated by Mr. W. J. Sommerville. Water is obtained from the Makobe River and distributed to approximately 30 homes.\* No chlorination facilities have been provided on this system, but the installation of a chlorinator has been recommended by the OWRC to insure the bacteriological safety of this supply.

It should be noted that although the report concludes that the results of samples collected from the watercourses are within Commission objectives, this does not render the water satisfactory for drinking. The OWRC objectives generally are based on water which would be used for swimming rather than culinary and drinking purposes. The Commission recommends that any surface-water supply source receive a minimum treatment of chlorination.

Chemical analyses of water from these water supplies reveals the water is generally soft, slightly exceeds the Commission objectives of 0.3 parts per million for iron content and exceeds the colour objective of five units.

Generally, the small private systems do not provide chlorination treatment and the overall need for a municipal water supply in Elk Lake is apparent. This has been considered in the past by the township council and the development of these works will be predicated by whether there will be a growth of the population due to expanding industry and/or the availability of finances.

\* as of June, 1965

#### IV SEWAGE DISPOSAL AND STORM DRAINAGE

The malfunctioning of private sewage-disposal systems in the community results in the access of inadequately treated sewage to the storm drainage ditches. The storm ditches along Third Street east of Pine Street are particularly adverse in this regard. These ditches drain to the Montreal River at sampling points OM 477.83-D and OM 477.86-D. Apparently the soil in the area is not well drained, resulting in the overflow of sub-surface disposal systems. The Timiskaming Health Unit has recommended the improvement of drainage by the construction of a ditch along the back of the premises in order to carry off surface water and therefore provide better sub-surface drainage.

During the survey the presence of inadequately treated sewage was noted also in the area of Elk and Front streets and beside the Riverview Restaurant. The health unit was investigating the former problem at the time of this survey and had previously recommended the correction of the Riverview Restaurant's malfunctioning septic tank system. Also it is noted that recently, the health unit gave approval to a septic tank system designed by a local consulting engineer for the Elk Lake Lodge, a local hotel.

During the survey there was no flow to the watercourses in any of the storm ditches with the exception of the ditch behind the Department of Highways garage (sampling point no. OMA 478.35-W). A sample collected here revealed a BOD of 7 parts per million and a

coliform count of 48,000 per 100 ml. There was also evidence of oil in this discharge. This source of contamination should be located and eliminated.

It should be noted that the sewage accumulates rather than flowing directly to the watercourses. During rainstorms, the accumulations are washed to the watercourses, but the high dilution factor would tend to minimize the effects on the surface waters. Nonetheless they are a source of water pollution and can be considered a health hazard.

#### V REFUSE DISPOSAL SITE

The refuse disposal site is located just outside the western extremity of the community near Highway 560. A small tributary of the Makobe River flows within fifty feet of this site prior to its discharge to the river. During the survey, refuse was noted in this tributary downstream from the dumpsite at the Gowganda Road. The results of a sample collected at the road were within the Commission objectives for surface waters, but due to the proximity of the dumpsite to the watercourse it must be considered a source of potential pollution. Therefore, it is recommended that the garbage not be dumped any nearer to the stream. It would also be advisable to construct an impervious dyke around the garbage disposal site to prevent runoff from the area reaching the watercourse along the ground surface.

## VI RESULTS OF SAMPLES COLLECTED

In addition to the adverse sample result noted above, a slightly high coliform count was obtained in the sample collected from the small creek near the ONR station and a higher coliform count of 10,000 per 100 ml was obtained in the sample from the same stream at its discharge point at the Department of Lands and Forests dock. This may be due to the access of some inadequately treated sewage, particularly in the area of Third Street. However, the BOD and solids contents of these samples were within Commission objectives. All of the samples collected from the Makobe and Montreal rivers displayed results within Commission objectives for surface waters.

The ultimate solution to the sewage disposal in the community would be the construction of a municipal sewage works system. The OWRC has advised the municipality on the general methods which may be utilized to implement sewage works programmes and the municipality has indicated that these are being kept under consideration.

## VII SUMMARY

This is a report on a water pollution survey of the community of Elk Lake in the Township of James, the purpose of which was to locate and record any sources of existing and potential water pollution.

The results of samples collected from the Makobe and Montreal rivers were within OWRC objectives for surface waters.

However, there is a problem of malfunctioning sub-surface sewage disposal systems allowing sewage to gain access to drainage courses, and during periods of heavy rainfall this is washed to these rivers. The local health unit is working on the correction of sewage disposal problems on a private basis. Provision of municipal sewage works is being kept under consideration.

Two of the three major water supply systems, which use the Montreal and Makobe rivers as sources have chlorination facilities. Such facilities have been recommended for the third supply and should be a part of any water supply drawn from these rivers.

#### VIII RECOMMENDATIONS

1. The attempts to correct malfunctioning sewage disposal systems on a private basis should be continued.
2. The feasibility of providing the municipal water and sewage facilities should be kept under consideration.
3. All surface water supplies which are used for drinking should receive a minimum of chlorination treatment.
4. The source of contamination to the ditch behind the Department of Highways garage should be located and eliminated.
5. Improvements to refuse disposal practices should be implemented as outlined in the report.

/elc

Prepared by:

  
M.M. Holy, Technician,  
Div.of Sanitary Engineering.

## APPENDIX I

### SIGNIFICANCE OF LABORATORY ANALYSES

#### Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

#### Sanitary Chemical Analyses

##### Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

##### Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greater than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

## APPENDIX

### IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

#### OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

##### 1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALL-Y OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

## COMMUNITY OF ELK LAKE

## TOWNSHIP OF JAMES

RESULTS OF SAMPLES PERTAINING TO MONTREAL RIVERTABLE I

Sampling Point No.	Description	Date	5-Day Solids			M.F. Coliform Count per 100 ML	EST. DWF (GPM)
			BOD (ppm)	Total (ppm)	Susp. (ppm)		
OM 477.75-N	Montreal R. across from Lands & Forests dock.	Aug. 22/67					530
OM 477.75-S	Montreal R. at Lands & Forests dock.	Aug. 22/67	1.4	76	4	72	160
OM 477.75-W	22-inch corruga- ted metal outfall at Lands & Forests dock.	Aug. 22/67	1.0	126	6	120	10,000
C 0.43	Small creek at Pine Street.	Aug. 22/67	0.9	108	5	103	3,100
OM 477.83	Montreal R. adja- cent to Third St. ditch.	Aug. 22/67	0.9	110	21	89	1,280
OM 477.83-D	Third St. ditch draining to Montreal R.	Aug. 22/67					No flow
OM 477.86-D	Ditch draining to Montreal R. east of Pine St.	Aug. 22/67					No flow

TABLE I (CONTD)

Sampling Point No.	Description	Date	5-Day			Solids		M.F. Coliform Count per 100 ML	EST. DWF (GPM)
			BOD (ppm)	Total (ppm)	Susp. (ppm)	Diss. (ppm)			
OM 477.89-D	Small creek flowing to Montreal R. at Rosedale Ave.	Aug. 22/67	1.4	152	8	144		370	
OM 477.95	Montreal R. at Government dock.	Aug. 22/67	0.7	70	3	67		210	
OM 477.95-W	12-inch corrugated metal storm outfall beside Govt. dock.	Aug. 22/67						No flow	
OM 477.96-W	Corrugated Metal storm culvert at Front St.	Aug. 22/67						No flow	
OM 477.97	Montreal R. opposite Elk Lake Lodge.	Aug. 22/67	0.7	80	7	73		1,010	
OM 478.0-N	Montreal R. at Main Bridge (north side).	Aug. 22/67	0.9	90	6	84		350	

TABLE I (CONTD)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids			M.F. Coliform Count per 100 ML	EST. DWF (GPM)
				Total (ppm)	Susp. (ppm)	Diss. (ppm)		
OM 478.0-S	Montreal R. at Main Bridge (south side)	Aug. 22/67	0.8	76	2	74		
OM 478.05-W	12-inch corrugated metal storm outfall at King & Lake sts.	Aug. 22/67					No flow	
OM 478.15-N	Montreal R. at foot of James St.	Aug. 22/67	1.3	88	8	80	1,250	
OM 478.15-S	Montreal R. at bathing area.	Aug. 22/67	1.1	54	4	50	1,080	
OM 478.16-W	Corrugated metal culvert at foot of Pearl St.	Aug. 22/67					No flow	
OM 478.20-W	Culvert drain- ing to ditch at First and Spruce sts.	Aug. 22/67					No flow	

TABLE I (CONTD)

Sampling Point No.	Description	Date	5-Day			M.F. Coliform Count per 100 ML	EST. DWF (GPM)
			BOD (ppm)	Total (ppm)	Solids Susp. (ppm) Diss. (ppm)		
OM 478.29-D	Ditch draining to river at First & Elk sts.	Aug. 22/67					No flow
OM 478.35-W	Culvert drain- ing to ditch behind Dept. of Highways.	Aug. 22/67	7.0	516	32	484	48,000 <1 gpm
OM 478.5	Montreal R.up- stream from Elk Lake.	Aug. 22/67	0.9	63	3	60	370

COMMUNITY OF ELK LAKE

TOWNSHIP OF JAMES

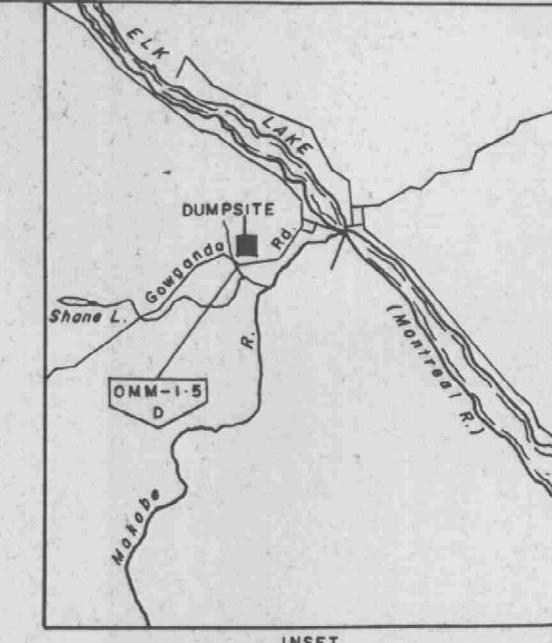
DESCRIPTION OF OUTFALLS AND RESULTS OF SAMPLES PERTAINING TO MAKOBE RIVER

TABLE II

Sampling Point No.	Description	Date	5-Day	Solids			M.F. Coliform	EST.
			BOD (ppm)	Total (ppm)	Susp. (ppm)	Diss. (ppm)	Count per 100 ML	DWF (GPM)
OMM 0.05	Makobe R. at First St.	Aug. 22/67	1.2	120	4	116	190	
OMM 0.05-W	12-inch corrugated metal outfall to ditch at First St.	Aug. 22/67						No flow
OMM 0.16-W	12-inch corrugated metal storm outfall at foot of Second St.	Aug. 22/67						No flow
OMM 0.18-W	12-inch culvert draining toward Makobe R. west end of Third St.	Aug. 22/67						No flow
OMM 0.28-D	Ditch draining to Makobe R. at Fourth St.	Aug. 22/67						No flow

TABLE II (CONTD)

<u>Sampling Point No.</u>	<u>Description</u>	<u>Date</u>	<u>5-Day BOD (ppm)</u>	<u>Total Solids (ppm)</u>	<u>Susp. (ppm)</u>	<u>Diss. (ppm)</u>	<u>M.F. Coliform Count per 100 ML</u>	<u>EST. DWF (CPM)</u>
OMM 0.50	Makobe R. at Makobe Park.	Aug. 22/67	1.2	86	4	82	240	
OMM 1.5-D	Makobe R. tribu- tary at Highway just downstream from dumpsite.	Aug. 22/67	0.8	166	2	164	270	



INSET  
SCALE: 1" = 2 M



#### LEGEND

OM-478-5 - STREAM SAMPLING POINT SHOWING MILEAGE

OM-478-35 - OUTFALL SHOWING STREAM AND MILEAGE  
D - TYPE OF OUTFALL

D - DRAINAGE OR DITCH

W - STORM SEWER



ONTARIO WATER RESOURCES COMMISSION

**COMMUNITY OF ELK LAKE  
TOWNSHIP OF JAMES  
WATER POLLUTION SURVEY  
1968**

1968

DATE: FEBRUARY, 1966

BY : L. L. BROOME DATE : FEBRUARY, 1968  
ED. BY : M. H. DRAWING No: 68 - 15

ED BY: M.H. DRAWING NO: 68-15